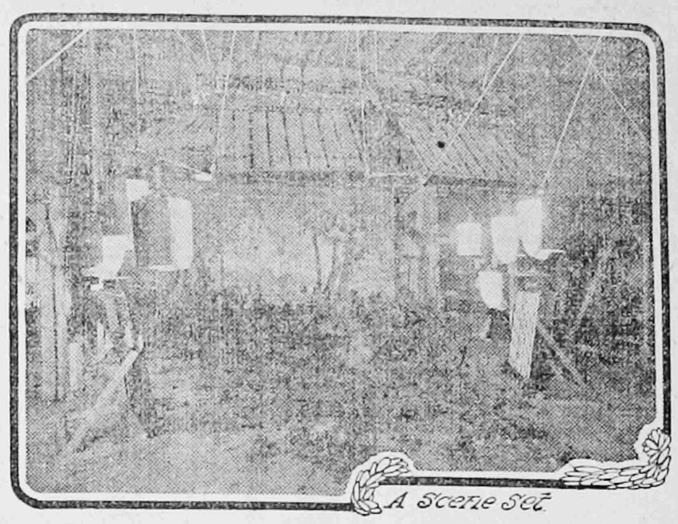
How Moving Pictures are made to TALK

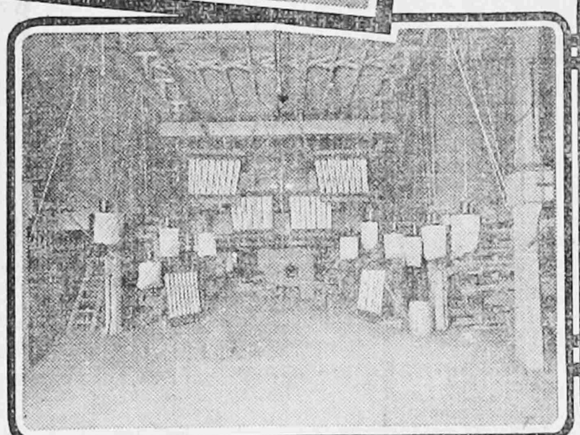
By A. R. Parkhurst Jr.

Making the Machines

Rehearsing an Act



A Scene Set



Lights Set For Picture Making

Making a Record

CHOSE who live in cities are growing more and more familiar with the phrase "talking pictures," as customarily displayed on the front of moving picture shows or theaters. And if, his curiosity piqued by the oddity of the idea, one pays his nickel or dime to enter one of these places of wonder, he usually finds ordinary—often very ordinary—motion pictures projected upon the screen and accompanying a few of the pictures hears the sound of voices coming from behind the screen. In a few moments, from the inane dialogue and the crudities of cheap diction and cruder enunciation which reach his ear, he detects the truth, that some cheap actors are doing the talking, improvising dialogue to presumably fit the action of the characters thrown on the screen. These characters, by the way, having been posed by actors before the motion-camera without the faintest idea of speaking dialogue, and enacting the scenes purely in pantomime, without uttering a word or opening their mouths.

But genuine talking pictures exist, nevertheless, and are astounding spectators and listeners in many cities of the United States, not only with dialogue perfectly fitting the scenes on the film, with the very movements of the lips by the characters in the picture, forming every word, but presenting entire plays, whole operas and all kind of musical performances.

The exhibitor or theater manager receives each week in a small padlocked box, measuring 13 by 15 by 18 inches, the orchestra, stage hands, scenery costumes, press agent, posters and photographs, figuratively speaking, of an opera company presenting "The Mikado," or "Pinafore" or "The Chimes of Normandy."

The sound volume is astonishing, being sufficient to make every word or note of music clearly heard through such huge theaters as the Auditorium, Chicago, and the Grand Opera House, New York, during long runs of this form of entertainment. The process of making this "ready-made" entertainment is wonderfully interesting. On the top floor, as far as possible away from the clatter of the street traffic, is the recording-room. Here the opera company, orchestra, vaudeville team, lecturer, vocalist or instructor sings, plays or talks the words into the recording phonograph, making the master record. This is then passed to the platers, who carefully set it in a chemical bath with electric current passing through it. After a day or two a layer of copper is deposited upon the surface of the record, conforming to the minute dents made in it by the recording phonograph needle. When the copper layer is sufficiently heavy the record or cylinder is then taken out and backed with a stiffer collar of brass, which makes it a mold or matrix.

This, set on a core, constitutes a mold into which melted wax is poured and duplicate cylinders or records are made; as many as are desired. After cooling and some trifling trimming or paring, such a record is ready to put upon the reproducing phonograph, which may be thousands of miles away.

First, however, the film must be photographed, the picture taken. This process follows the phonograph work, naturally, for, as everyone familiar with the basic laws of sound knows, the speed of a phonograph's revolutions must be steady, not variable. Slow down your own phonograph at home and you lower the musical pitch of the note produced and vice versa. Hence, in all stages of making or reproducing these real talking pictures the picture film must follow the sound, not the sound the picture. And here is the most interesting phase of the proceeding. On the floor below the phonograph departments and the rehearsal halls is the studio, or stage, where the performances are given—sometimes by 40 or 50 actors and actresses. Every effort at strong portrayal is made, to impress the camera.

After thorough rehearsing within sound of the phonograph rendering the words the performers are familiar with every word and pause and, with the scene fully set, the camera is made ready to photograph them. A motion-picture camera is a mechanism like a motion-picture projecting machine reversed. Its crank or main shaft must be turned, so that on the film traveling on sprockets past the lens the successive little images are caught. It is merely successive snap-shotting at the rate of 16 or more exposures a second. Naturally, in indoor photography the scene must be brilliantly lighted. About 100,000-candlepower of light is used, from Cooper-Hewitt mercury vapor tubes and arc lights.

Watching this stage performance given for its effect upon the camera we see a regular drop curtain, back of which the characters await their "cues," as in a theater. At the signal the camera mechanism starts and with it the cylinder of a phonograph, geared with it. A whirring sound, the camera is "snap-shotting," the curtain lifts, the phonograph connected with the camera rolls out its music, let us say, if an orchestra be involved in this play. The "curtain music," as it is called in a theater, subsides; the actor hears from the phonograph his "lines" and speaks in unison and continues to do so until the scene is ended and the curtain falls. If there be a dozen actors each does likewise. The film thus photographed is the "negative," as in ordinary photography. Into the dark developing-room it goes and is wound upon big drums or reels, as big as two barrels, end to end, for a 15-minute scene involves a thousand running feet of the film, about an inch wide. The drum revolves in the "hypo" and other tanks, watched carefully. From bath to bath it passes until it is clearly developed. It is then dried and used to print positives.

In the printing process the negative and the positive pass before a fixed strong light and the latter is acted upon in a manner similar to the photograph papers with which we are so familiar.

The positive film is then developed and dried. It is now ready to entertain many audiences, being shipped out with its accompanying "records" for the phonograph.

In exhibitions the operator of the picture machine has at all times a perfect control of the speed of his projecting machine. He causes it to follow the singing of the phonograph—or the speaking, as the case may be—in absolute synchrony. The result is a perfectly human illusion, every movement of the lips of a character on the screen forming the sound of the words as the audience sees and hears. The phonographs are, of course, directly behind the sheet on which the pictures are thrown. Two phonographs are used in order to prevent pauses or lapses in long performances. Some pieces, for instance, such as an act of an opera, last 20 minutes or longer, and, as no phonograph record can be made longer than for a four or five minute rendition, the two phonographs permit of one record following another without a break. The opera "Mikado" has been produced with slight condensation, each act containing all its allotted musical numbers and the requisite comedy dialogue to make it a satisfying and complete presentation of the opera.

The most wonderful developments are crowding each other in an educational scope for motion photography and motion picture projection. The United States government has adopted the motion picture for use in stimulating enlistments in the Army and Navy. In England and America elaborate motion views have been made by the score, illustrative of natural history studies; motion pictures of the fishes of the sea, the birds of the air, of insect and microscopic life. Views of surgical operations upon the human body. All these studies, together with geography, meteorology, sociology and other sciences are being taught with wonderfully illuminative effect by the motion picture.

It is impressive to see a statesman of national fame in the motion picture. Imagine having his personality presented to your gaze a thousand miles away and hearing and seeing him address you upon one of the live issues of the day! One will now be able to hear a sermon delivered by a great preacher in New York, or Boston, or Chicago without leaving one's home town. If it is interesting to see the beautiful religious scenes of "Quo Vadis" enacted in pantomime, it is positively wonderful and inspiring to hear and see it enacted, with the solemn chanting of the Christian prisoners in the Mamartine prison, hear the gruff words of the Roman soldier guards and to experience the thrills of the arena, with the roaring of the wild beasts, the blast of trumpets, the shouts of the populace, the dialogue between Nero, Ursus, Lygia and Marcus Vinicus. Among the many educational subjects so far produced the re-enactment of history plays an important part. Sitting in the lyceum, church, school or hall in our town we have brought to us the interior of quaint little St. John's Church, Richmond, Va., with the convention of 1775 in session. We hear the murmur of the attending delegates and recognize in the crowded pews such deathless patriots as Washington, Jefferson, Lee, Randolph and Patrick Henry. We listen to the proceedings. A milk-and-water royalist's resolution is read. Henry, unable to control himself, springs to his feet and gets the attention of the chairman. He proposes his historic amendment to organize a militia to defend the colonies against Great Britain. It is a firebrand in a magazine. In the tensely dramatic scene ensuing he fights down the royalist opposition and fairly sweeps the assemblage from its feet by his burning, matchless eloquence, concluding with "Give me liberty or give me death!"

"Washington's Farewell Address," "Lincoln's Speech at Gettysburg," "Webster's Debate With Hayne," "Napoleon's Farewell to His Troops," "Cornwallis' Surrender to Washington" are a few of the historical episodes in preparation.

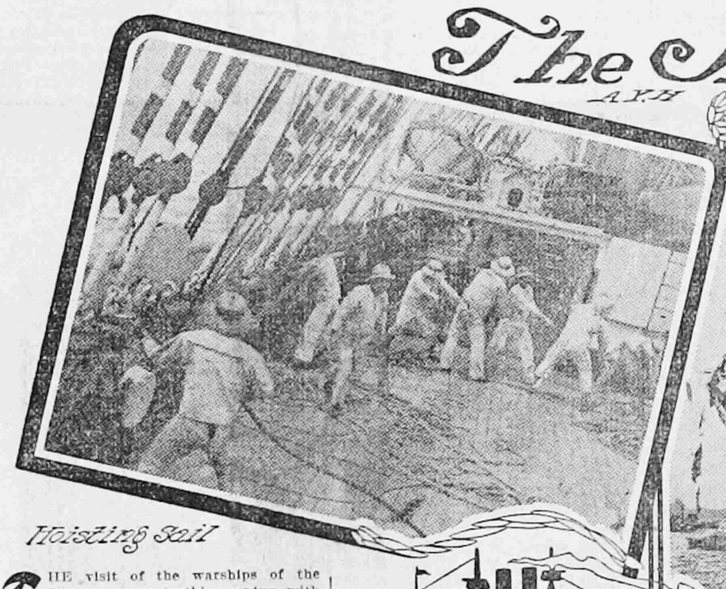
Can any book lesson in history be so graphic or so impress the human mind! The reader will soon be able to enjoy the privilege of a "sightseeing tour through New York," without leaving home and of having all the objects of interest explained to him as they pass on the screen. And equally entertaining travel talks and walks—or rides—through foreign scenes, "Through the Streets of Hongkong," "Servia and Its People" and the "Champagne Industry," etc.

Smokeless Battleships.

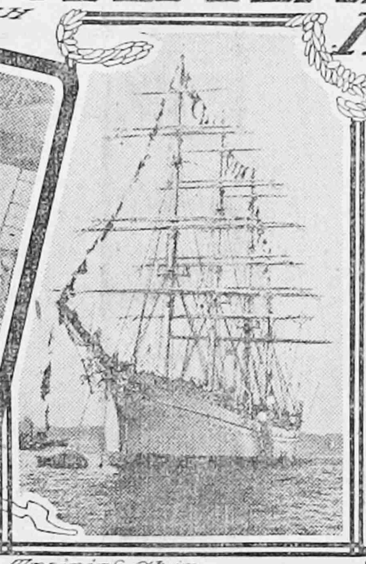
WITHIN the course of a few years England expects to have a fleet of battleships, steamless, smokeless and stackless, by the use of the internal combustion engine for propulsion. Recent experiments have been very successful, and a huge battleship of this pattern has already been designed. It will be 540 feet long, 80 feet broad and have a displacement of 21,000 tons. The advantages of the internal combustion are many, one of which is that there will be no smoke to draw the attention of the enemy. There will be no funnels to obstruct the deck, the engines will be better protected and the oil tanks will be easier filled, both at sea and in harbor, than bunkers with coal.

The JAPANESE SAILOR IN THE MAKING

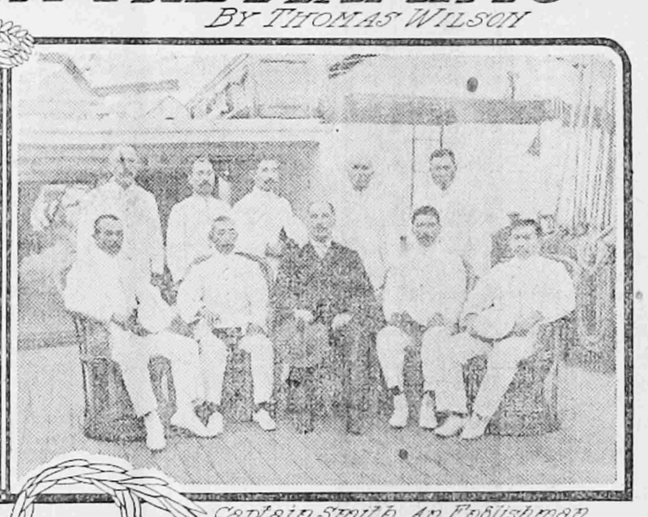
By Thomas Wilson



Hoisting Sail



Training Ship "Taisei Maru"



Captain Smith An Englishman and Officers

Wash Day on Shipboard

Officers Playing Deck Billiards

Cadets Taking Observations

IHE visit of the warships of the Japanese navy to this country, with the recollection of the great conflict of that nation with Russia, the recent "unpleasantness" in California, makes the "little brown men" of particular interest to the people of the United States and the world at large.

It was the wonderfully trained legions of the Mikado that fought the greatest battles of modern times and drew the attention of the officers of the armies of the world, and now that peace has been established the officers of another army—army of industry—are watching.

Almost the moment the Russo-Japanese war was over the Japanese began to prepare for a campaign in industrial arts. The dozens of small steamers that had been used as troop ships were turned into merchant craft, while the government with a liberal spirit fostered the building of a huge fleet of steam craft of all types.

To man these craft it was not necessary to call upon master mariners of other nations for the country has one of the most modern training schools for merchant service, a school that will rank well with any in existence.

The school is not new; indeed, it was founded in 1875, just one year after the United States government authorized the establishment of a merchant marine training service and giving American coastwise cities the use of obsolete war craft as training ships.

Whether the Japanese copied the idea from this country is not known, but at any rate it was in the eighth year of Meiji (1875) that Tashimichi Okuho suggested to his government the feasibility of establishing a similar school by the founding of a steamship line and taking cadets.

So quickly did the authorities approve of the plan that by the following February a training ship was in commission and the nautical college—the Shosen Gakko—was established.

On January 10, 1877, five young men who had finished their theoretical training were given what might be termed "roving commissions," and were placed on board vessels to obtain the practice of seamanship. A little later 10 of the more advanced students were sent to England to ship on vessels going to foreign ports.

This was the beginning of the sending of young men away from home to study and to observe what other nations were doing. That the Japanese did well goes without saying, for it was not many years after that the little men from the Island Empire were in every civilized navy.

It is stated that one of our naval officers while in Japan during the Russo-Japanese War was astonished to meet in command of one of the first-class warships a Jap who for several years had been his steward.

A few years ago a whole Japanese crew was discharged from a sailing ship at Baltimore and when they were taken to the Immigration Commissioner's office and asked whether they intended to remain in this country the spokesman of the party said that they only proposed to remain for a few months and would then ship on some vessel bound to the Continent.

On closer questioning the speaker said that he was the son of a wealthy dealer in mineral water near Tokio and that he and his comrades had been sent out by their government to make a trip around the world and that it was their intention to become officers in the royal navy. He said that all of the 16 men spoke English, having been taught by English instructors, and that they were also studying other languages.

In seeking his education the Jap has demonstrated that no obstacle will thwart him, and the idea of a man who is destined to become the commander of a huge battleship and who perhaps at the time ranked high, serving as a steward, is an example of their determination.

How many valuable secrets these officers of the Mikado's navy picked up while on board foreign warships is a matter of conjecture, but it is safe to assume that but little escaped their keen eyes.

In the meantime the Japanese government recognized the great value of the training school. It took the college from the hands of the individuals who were conducting it, made it a part of the imperial navy, enlisting the students and paving the way for them to become officers in that service.

All the while the college was adding ships to its fleet, or rather was spreading out graduated students on ships flying the Rising Sun, and in 1895 made it possible for graduates of all governmental and public middle schools to enter the college without entrance examination.

Within two years the capacity of the college was increased so as to permit the graduating of 100 students a year, and it was not more than two years before it was found necessary to have a training ship that was especially designed to meet the requirements.

This vessel, the Tsukishima Maru, was launched in 1899 and was a staunch sailing vessel. Unfortunately, she had been in commission but little more than a year when she was caught in one of those terrible typhoons that rage now and then in the Sea of Japan, and she was lost, with all hands. In fact, she completely disappeared, not even a bit of wreckage being found.

Despite this disaster the college was continued and was enlarged by the erecting of permanent shore quarters at Etchujima. The need of a proper training ship was felt, however, and in 1902 the present vessel, the Taisei Maru, was built.

This vessel is one of the most complete craft of her kind that has ever been built. She is of steel throughout, 270 feet long, 2,287 tons register and is not only rigged as a four-masted barque with full set of yards, but she has powerful twin-screw engines that give her a speed of ten miles an hour under sail.

The appointments of the vessel are all that could be asked for long voyages. She has a complete electrical outfit, lights and searchlights, a refrigerating plant; has numerous winches on deck to operate the sails, and is fitted besides with one-pounders.

The complement of the ship comprises four classes of cadets, each class containing from 20 to 30 young men. The lad who ships on the Taisei Maru enters in the lowest class, and when he is graduated he is a practical seaman, capable of navigating a vessel anywhere.

When the ship puts to sea the cadets are divided into two watches—port and starboard—and then each watch is divided into five divisions, as follows: forecastle, foretop, maintop, mizzentop and quarterdeck. Each man knows his station, and on the darkest night, no matter what the weather conditions may be, a command from the master, who is a naval officer, sends the lads scurrying to their positions.

This method of dividing the men into divisions is always practiced on deep-water ships, so as to avoid confusion, and there are many stories told of the sailors of our old navy who remained at their stations in fights until the rigging was shot away and they met their death by drowning.

The routine on the Taisei Maru is not unlike that on the American training ships. From 8 o'clock in the morning until 4 o'clock in the afternoon all of the cadets are on deck, but the watch that is not engaged in actually working the ship is at study. For the youngsters there are all of the studies that a lad would pursue in an ordinary public school, but for the first classmen is the special course, which consists of taking observations, working out courses by theory, etc., doing what a navigating officer in charge of a ship would have to do.

While the one class is studying the other class is putting theories into practice. The lower classmen are learning how to apply cleanser to brass, how to swab a deck, paint and varnish. The next class is learning how to splice ropes, make sails and rig. The class above is busy aloft learning how to lower and raise yards and spars while under way while the first classmen are those who are giving the orders.

Nor is that all, for the deck work is interspersed with work below, and this comprises everything from tossing coal into the furnaces to running the engines, the dynamo, the refrigerating plant, etc.

Besides all this work the cadets have ample opportunity to attend lectures that are given by the officers of the ship. Maritime law and insurance, the stability of ships, etc., are among the subjects touched on.

One of the features of the training is that there is an Englishman who gives the boys instructions in reading and writing in that language. The chief engineer gives lectures on his department, and so does the surgeon, instructing the boys in how to apply first aid to the injured.

The monotony of studying and working the ship is broken by frequent fire and boat drills. Boat races are indulged in whenever there is an opportunity, and all athletic sports are encouraged.

While the ship is capable of making long voyages, and is now on a trip around the world, a point is made to touch as many ports as possible, so as to give the lads shore leave.

So zealous are those in charge of the ship in their desire to instil knowledge into the minds of those under them that the trips ashore are made instructive. As an illustration of this was a visit made to a cane field in Honolulu a year or so ago, when the cadets were given a lecture on the method of growing cane and were then taken into a field to see it growing.

In England the cadets are taken to the great shipyards, where the boys are shown how the great ships are built. All pleasure is not overlooked, however, and the boys go on sight-seeing tours, sometimes far inland.

After a course of two years upon the Taisei Maru even the boy who entered in the lower class is pretty well qualified as a navigator, and should he pass the examination he is given his certificate enabling him to take his place on the quarterdeck of a merchant vessel.

When the war with Russia broke out and Japan secured from all over the globe ships in which to transport her troops to the battlefields it was not the naval officers, but the graduates of the nautical college who took command of the craft. These young men demonstrated their ability to a high degree and in navigating waters abounding in floating mines that now and then claimed a ship, they showed much daring.

With the close of the war and the possibilities of the development of vast trade in Manchuria the Japanese government made it possible for the people to take over the former transports and turn them back into freight carriers by not only selling them at low figures but even subsidizing steamship companies.

Never in the history of the Island Empire has there been such a boom in shipbuilding as since the close of the war. In practically every port passenger and cargo steamers for coastwise and foreign service are being turned out.

Nor will Japan feel the need of men to operate the ships. There may have been a time when foreigners filled high positions afloat and ashore, but that was when the Japs were studying. Now they have learned, and through their nautical college they are paving the way to invade the world of commerce with high-powered, deep-hulled steamers, manned from stokehold to quarterdeck by men of their own nationality.

Is it any wonder then that the leaders of the army of industry in all parts of the globe are watching closely the progress of the little brown men, for they realize that they will eventually become a big factor in international commerce.

Peruvian Mummies Older Than Egypt's.

ASTOUNDING discoveries in Peru have now apparently demonstrated that the civilization of the ancient Incas is at least as old as any Egyptian era of which there is authentic trace. This is established by the recovery of a quantity of Peruvian mummies which are said by scientific authorities to be 9,000 years old, that is antedating the Christian era by 7,000 years. This is as old, if not older, than any Egyptian mummies ever brought to light and antedates or equals in age any authentic inscriptions of Egypt.

The Peruvian mummies were found under another ancient Peruvian burying ground. That is, the mummies were discovered in a stratum of earth beneath a cemetery thousands of years younger than the one underneath. This marvelous repository of a civilization 9,000 years old in South America is situated 200 miles inland from Lima, capital city of Peru, and high up in the mountains.

The soil in which the bodies had been interred is a peculiar silicate, and this chemical property of the earth surrounding the bodies had soaked the mummies with a solution best suited to preserving the body entire. As a result the hair of these mummies was in a splendid state of preservation, and the skin, teeth and the very clothing was intact. When exposed to the air the bodies at once crumbled away, but photographs were made of them and have been sent to the Royal British Museum.

The anthropology of these ancient people was decidedly Mongolian. That is, the cast of features and the skulls showed strong resemblance to the Tartar races. Just what this will be interpreted to mean by scientists cannot, of course, be forecasted, but it apparently points to the same origin for all the ancient races of the earth. The copper war axes found alongside these mummies proves the race not to have been acquainted with iron, but the workmanship on these weapons shows that the race was advanced in the crafts to a marked extent. Huge wooden war clubs were also found strangely carved. Gold and silver coins were also found with the bodies.

It now seems more probable that mankind really originated in some continent over which now the waves of the Atlantic Ocean roll, and that from this point civilization spread toward both Asia and the South American Continent.

The most wonderful of all the finds in this prehistoric Peruvian burial ground is a quantity of massive jars of pottery. Some of them are fully six feet high and several feet in diameter. On them is a fine high glaze, said to have been practically uninjured by 6,000 years' underground existence.

They are carved, and these carvings tell more than any other detail of the discovery of the life and character of these people. The decorations are crudely cut into the pottery and are said to be decidedly Chinese in character. There are huge dragons and mermaid-looking creatures on the vases.

On each vase was beautifully sculptured the face belonging to the mummy with which this special jar or vase was interred. Hence there was probably some religious belief connected with the burying the vases with the bodies. The true information to be obtained from this, the most valuable discovery of the last hundred years in the way of archaeological disinterments, will not be fully known until the experts of the world have had time to pore over the various exhibits and decide just what the actual scientific relations are.